Volunteer Lake Assessment Program Individual Lake Reports

BERRY BAY, FREEDOM, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	230,326	**Max. Depth (m):**	11.6	**Flushing Rate (yr^{1})**	254
Surface Area (Ac.):	145	**Mean Depth (m):**	3.7	**P Retention Coef:**	-0.01
Shore Length (m):	5,800	**Volume (m^{3}):**	2,147,000	**Elevation (ft):**	406

TROPHIC CLASSIFICATION

Year	Trophic class
1987	OLIGOTROPHIC
2003	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

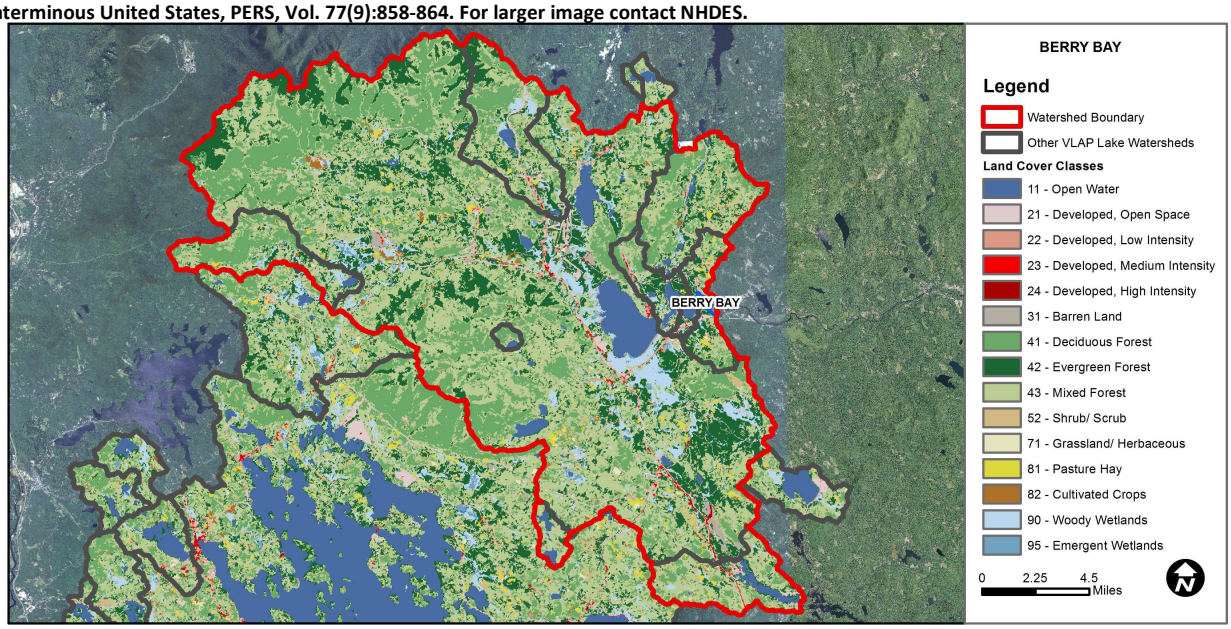
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (mg/L)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	D.O. (% sat)	Cautionary	< 10 samples and 1 exceedance of criteria. More data needed.
	Chlorophyll-a	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	No Data	No Data for this parameter.
	Chlorophyll-a	Very Good	At least 10 samples with 0 exceedances of criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

BROAD BAY - CAMP ROBIN HOOD BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
BROAD BAY - CAMP HUCKINS BEACH	E. coli	Encouraging	>2 samples exist that are > 75% of geometric mean criteria, but not enough samples to calculate geomertic mean. No single sample exceedances. More data needed.
LEAVITT BAY - CAMP MARIST BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.

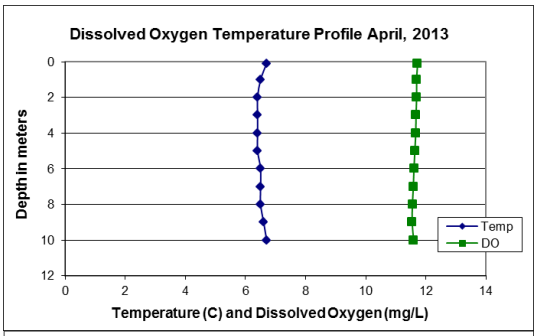


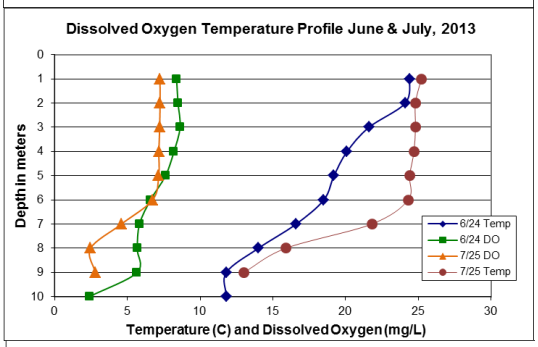
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	3.63	Barren Land	0.63	Grassland/Herbaceous	0.36
Developed-Open Space	3.02	Deciduous Forest	23.03	Pasture Hay	0.93
Developed-Low Intensity	0.78	Evergreen Forest	20.56	Cultivated Crops	0.49
Developed-Medium Intensity	0.25	Mixed Forest	38.3	Woody Wetlands	4.62
Developed-High Intensity	0.04	Shrub-Scrub	2.7	Emergent Wetlands	0.6

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
BERRY BAY, FREEDOM, NH
2013 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **CHLOROPHYLL-A:** Chlorophyll levels were very low through July and increased slightly in September. Average chlorophyll levels were well below the state median and decreased from 2012. Historical trend analysis indicates relatively stable chlorophyll with moderate variability between years.
- **CONDUCTIVITY/CHLORIDE:** Conductivity and chloride levels were average for most NH lakes and approximately equal to the state median. Historical trend analysis indicates significantly decreasing (improving) epilimnetic conductivity since monitoring began. We hope to see this continue!
- **TOTAL PHOSPHORUS:** April phosphorus levels were low and relatively uniform throughout the water column. Epilimnetic and metalimnetic phosphorus levels remained low and stable throughout the summer. Hypolimnetic phosphorus increased slightly June through August but still remained at low levels. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years.
- **TRANSPARENCY:** Transparency was good in May, decreased through the beginning of September, and improved by the end of September. Sampling events occurred following significant rain events in June, July and early September and stormwater runoff may have decreased water clarity. Historical trend analysis indicates transparency tends to be highly variable between years.
- **TURBIDITY:** Deep spot turbidities were low and relatively stable throughout the summer.
- **PH:** Metalimnetic and hypolimnetic pH were less than desirable range 6.5 – 8.0 units. Epilimnetic pH remained good and historical trend analysis indicates stable epilimentic pH with low variability between years.
- **RECOMMENDED ACTIONS:** The improving epilimnetic conductivity trend is a great sign. Water quality remained within good ranges considering the increased frequency and intensity of storm events in 2013; however transparency was generally lower following these events. This highlights the importance of reducing stormwater runoff to the Bay through local stormwater management projects. DES' "NH Homeowner's Guide to Stormwater Management" is a good resource. Keep up the great work!





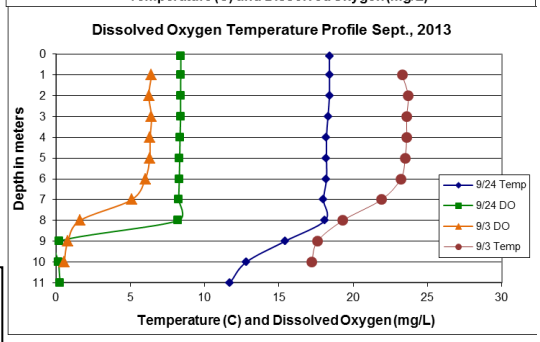
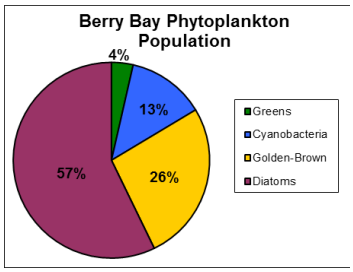


Table 1. 2013 Average Water Quality Data for BERRY BAY

Station	Alk.	Chlor-a	Chloride	Cond.	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	ug/l	m		ntu	
						NVS	VS		
Epilimnion	5.52	2.05	5	40.5	7	3.20	4.15	0.57	6.70
Metalimnion				39.6	7			0.53	6.60
Hypolimnion				43.8	9			0.86	6.37

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6



HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Stable	Trend not significant; data show low variability.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
Conductivity	Improving	Data significantly decreasing.	Transparency	Stable	Trend not significant; data highly variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.